

## Socio-Economic Determinants of Household Participation in Out-growers Scheme and Investor Farm- Employment in Kilombero Valley, Tanzania

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### Abstract

*Household participation in the out-grower scheme and investor farm employment has the potential of improving livelihoods of participating households. However, scientific debates on the socio-economic determinants of households' participation in the out-growers scheme and investor farm employment have not been conclusive and the number of out-growers dropping out of out-grower scheme remains significant. This paper aims at examining the socio-economic determinants of household participation in the out-growers and investor farm employment. The paper adopted a cross-sectional research design whereby exploratory sequential research strategy was adopted. About 376 respondents were involved in the survey. Qualitative data were collected through checklist of questions were analysed using content analysis while quantitative data were analysed using descriptive and inferential statistical analysis. The results indicate that demographic variables (older age and household headship), group membership, access to credit, distance from household premises to investor and asset ownership were important predictors of household participation in the out-grower scheme ( $P < 0.05$ ). The Results indicate further that demographic variables (younger age, household headship and household head marital status), household asset, household income and land size significantly influenced household participation in the investor farm employment ( $P < 0.05$ ). Therefore, household participation in the out-grower scheme favour youth household head, Male-Headed Household (MHHs), household in groups, household with higher land size, HHs with less access to credit and household with fewer assets. Participation in investor farm employment favours those households with older age, FHHs, low income, few assets, married, and households with large land size. It is recommended that there is a need for providing sugarcane technical training to out-growers. Also understanding of the factors that affect household to participate in the out-grower scheme and investor farm employment and how they relate to participation decision should be an important part in designing interventions aimed at improving production uptake*

**Keywords:** *out-growers scheme, investor farm -employment*

### 1.0 Introduction

The significance of large-scale agricultural investment that integrates household in an out-grower scheme and investor farm employment to rural household's livelihood cannot be over-emphasized. Different large-scale agricultural investment models including plantation modes and out-grower schemes provide different benefits that could support household livelihoods. According to Herrmann (2017), development of large-scale agricultural investments is considered by many as a major threat to the livelihoods of smallholder farmers. However, others argue that development of large-scale agricultural investment is an opportunity to them. In addition, out-grower scheme is increasingly being recognized as the best farming model in

addressing production and marketing of agricultural commodities in developing countries (Oya, 2012). Out-grower scheme involves large-scale production and processing facilities, which are surrounded by out-growers farm with wide ranges of sizes (Rocca, 2016). Investor farm employment in this study refers to employment of the household member in the investor farm.

Some of the analysts suggest that out-grower scheme which is considered as an inclusive farming model improves access to markets, credit and technology, employment, provision of agricultural extension, indirectly empowers women and youths, and develops a successful commercial culture (Singh 2006; Prowse, 2012; Glover and Kusterer, 2016). Inclusiveness of out-grower scheme implies integration of smallholder farmers into the markets with underlying principles that there are mutual benefits for the participating household and investor that ultimately needs to result in moving households out of poverty and improving food security (FAO, 2015). On the other hand, plantation farming model is reported to generate relatively better-paid employment for permanent skilled labourers (Hakizimana *et al.*, 2017).

There are widespread concerns that out-grower scheme and investor farm employment benefit more men than it does to women because of the differences in terms of socio-economic characteristics such as access to credit, extension services, training, land, participation in social groups and income and asset endowment (Dancer and Sulle, 2015). Previous experiences in Sub-Saharan Africa including Tanzania show that women are losing out from large-scale agricultural investments. Studies (e.g. Daley, 2011; FAO, 2011; Mutopo *et al.*, 2015; UNCTAD, 2015; Sexsmith, 2017) reported that women are less likely to work for wages as large-scale agricultural investments have produced gender division of labour. Similar findings are reported in a study in Zambia, which indicates that men were contract holders in sugarcane out-grower scheme and sugar dividends were captured by men, while women were involved with the production of food crops for home consumption (Hall *et al.* 2015). The study also shows that labour opportunities in the scheme were seasonal, short term, and with most of the seasonal workers being men. Few women had employment opportunities and these were concentrated in casual jobs such as weeding, planting while men dominated irrigation, cane cutting, fertilizer application, field supervision, and truck driving. Studies in Tanzania (e.g. Locher and Sulle, 2013; Dancer and Sulle, 2015) show that gender differentiated between young male cane cutters and weeders majority of whom were women and older men. A comparison between out-grower scheme and plantation model shows that in the latter model overall women have lower pay and less job security than men (Renzaho *et. al.*, 2017) do.

Considering that women are not homogenous group, they are differentiated in terms of how they are constrained to the participation in the out-grower schemes and investor farm employment. Poor women with limited livelihood options participate more in investor farm employment (Smalley, 2013). Studies (e.g. Oya 2013; Rocca, 2016) found a strong relationship between labour market participation and female divorce or widowhood. There was a correlation between divorced and widowed status of women and opportunities for access to better quality employment. Married women were more affected in their participation in the scheme and access to employment, as they were concentrated more in food crop production and domestic work (Rocca, 2016). Women lack tenure security and this inhibits their access to resources and constitute a barrier to the entry into out-growing. Gender ideologies where women's farm work is regarded as reproductive labour are also contributing to the low proportion of registered

women as out-growers in some areas (Renzaho *et al*, 2017). Studies (e.g. Tsikata and Yaro, 2013) also show that large-scale agricultural investment creates employment opportunities for women, although women dominate only casual positions with lower remuneration. Other studies (e.g. Dolan and Sorby, 2003) Singh (2003) Maertens and Swinnen, 2009) in Kenya, Uganda, Zimbabwe, Columbia, and Ecuador reported that women occupied at least 50 percent of the employment in flowers, canola, poultry and vanilla investments. In addition, White and White (2012) assert that in oil palm plantation in Northern Ghana, women had greater compensated productive work since they dominated the daily workforce.

It is evident from the reviewed literature that studies on socio-economic determinants of household participation in out-grower scheme and investor farm employment are inconclusive and the number of out-growers dropping from out-grower scheme remains significant. This is because some authors contend that the household socio-economic determinants of household participation in the out-grower scheme and investor farm employment favour male as opposed to female and are context specific and depends on the nature of the contract as well as the type of enterprise in question (FAO, 2011). In this respect, the socio-economic determinants of household participation in the out-growers scheme and investor farm employment cannot be generalized based on the reviewed literature. A thorough knowledge on the socio-economic determinants of rural household participation in the out-grower scheme and investor farm employment is pertinent in informing out-grower scheme and investor farm employment programming and targeting. This study specifically aimed at (i) analysing socio-economic determinants of household participation in out-grower scheme, and (ii) analysing socio-economic determinants of household participation in the investor farm employment in Kilombero Valley.

## **2.0 Methodology**

The study was conducted in Kilombero Valley in Kilombero District. The District was chosen because of its rank in the numbers of out-growers in Tanzania. Four villages were selected purposively: two villages around Kilombero Sugar Company Limited (KSCL) were selected based on two criteria, namely the number of out-growers, and the presence of out-grower associations and households working for KSCL. The other two villages were selected because of having households working with Kilombero Plantation Limited (KPL). The villages selected were Msolwa Ujamaa, Sanje, Mchombe, and Mngeta.

The study adopted a cross-sectional research design whereby data were collected once using a pre-structured questionnaire and checklist of questions. The design was thought to be suitable for the current study because it allows the collection of data, which can be used to determine the relationship between variables. The sampling unit was a household. The study adopted exploratory sequential research strategy whereby data collection and analysis start with the initial phase of qualitative data collection and the analysis followed by a phase of quantitative data collection and the analysis. The research strategy was adopted in order to integrate the results from two stages in order to expand the scope and improve the quality of findings. The qualitative phase of data collection involved Focus Group Discussions (FGDs) and Key Informants Interviews (KIIs). Seven FGDs with participants knowledgeable on the out-grower scheme and investor farm employment were conducted with each FGD having six to eight participants. Based on their knowledge on out-grower scheme, investor farm employment, and their position, seventeen KIIs were purposely selected. These includes two administrative secretaries of out-

grower associations, three Ward Executive Officers (WEO), four Village Executive Officers (VEO), two representatives from KPL and KSCL, one representative from SAGGOT, one representative from Sugar Board of Tanzania and Kilombero District Agricultural, Irrigation and Cooperative Officer (DAICO).

The quantitative phase of data collection involved a household survey whereby 400 respondents were involved. The proportional of village population sample using a household village register was applied to determine a sub-sample from each village and thereafter, simple random sampling was used to pick the respondents from each village. Some respondents were dropped due to incomplete data resulting into a sample of 376, which is 94 percent of the total sample size expected.

By assuming a 95 percent confidence level and a precision of 0.05, the required sample size was obtained using the following formula:

$$n = \frac{N}{N(e^2) + 1} \dots\dots\dots \text{(Yamane, 1967 as cited by Israel, 2013)}$$

Where:

n is sample size,

N is the population of all households in study villages and

e is the level of precision.

According to the National Census of 2012, the number of households in the four villages which were to be included in the study is 5914. Using the above formula, a sample of 400 households was obtained for all villages. The formula used for the sample size at specific village (proportionate) was adopted from Kothari (2004) using the following formula:

$$n = \frac{N(\text{Onevillage}) \times n(\text{allvillages})}{N(\text{Alhvillages})} \dots\dots\dots \text{(Kothari, 2004).}$$

Thereafter, a simple random sampling using lottery technique was used to select the respondents from each village. The sub-sample from each village is indicated in Table 1.

**Table 1: Sample Households from selected Villages**

Village	Households	MHH	FHH	Out-growers	Investor farm worker	Non-Participants	Sample size
Mngeta	1286	77	10	-	38	49	87
Mchombe	1650	77	12	-	42	47	89
MsolwaUjamaa	1832	78	44	44	31	47	122
Sanje	1146	64	14	41	18	22	76
Total	5914	296	80	85	129	165	400

Qualitative data were analysed using content analysis method whereby the collected information was organized into abstract themes based on the study objective. Quantitative data were analysed using Statistical Package for Social Sciences (SPSS). Binary Logistic Regression was used to identify socio-economic factors that influence households into participating in the out-grower

scheme and investor farm employment. The model was chosen out of a range of alternative regression models such as probit because it accepts two categorical independent variables. The model was also thought to be suitable since household participation in the out-grower scheme and investor farm employment is an individual's decision, which is based on the probabilities of choosing either to participate or not to participate. The easiest and most widely used discrete choice model is logit.

The model used was:

$$\text{Logit}(p_i) = \log(p_i/1-p_i) = b_0 + b_1x_1 + b_2x_2 + \dots + b_{12}x_{12} + \mu_i \text{ (Agresti and Finlay, 2009)}$$

Where:

$\text{Logit}(p_i) = \ln(\text{odds}(\text{event}))$ , that is the natural log of the odds of an event occurring

$p_i$  = prob (event), that is the probability that the respondent engaged in the out-growers and investor farm wage employment.

$1-p_i$  = prob (nonevent), that is the probability that the respondent will not be engaged in the out-growers and investor farm wage employment.  $b_0$  = constant of the equation,

$b_1$  to  $b_{12}$  = coefficients of the independent (predictor, response) variables,

$k$  = number of independent variables,

$x_1$  to  $x_{12}$  = independent variables entered in the model.

The operationalization of variables, which were entered in the binary logistic model are as shown in Table 2.

**Table 2: Operationalization of Variables entered in Binary Logistic Model**

SN	Explanatory variable	Measurement	Expected Sign	Description	Comment
1	Education level	Continuous	+	Years of schooling that a farmer achieved	The more educated, the better negotiation and information processing capacity
2	Gender	Dummy	+	1; if Male 0; if Female	Male more chances of participating in the out-grower scheme
3	Age	Continuous	+	Age of the household head	Older household head more chances of participating in the out-grower scheme
4	Land size	Continuous	+	Size of the farm (hectares)	Large size increases chances of a participation in out-grower scheme
5	Household size	Continuous	+	Number of household members	Large household size reflecting availability of more labour force to facilitate production and transportation of crops
6	Household income	Continuous	+	Total household income in TZS	Higher income more chances of joining the out-grower scheme
7	Distance from the investor	Continuous	-	Distance in km	Less distance increase the chances of participating in the out-grower scheme
8	Marital status of the household head	Dummy	+	1 if married, 0 if otherwise	Married have more chances of participating in the out-grower scheme
9	Access to credit	Dummy	+	1=if the farmer has access to credit 0=if no access	Credit access provide more chances of participating in the out-grower scheme
10	Access to extension services	Continuous	-	measured by frequency of visit by extension officer	More visits increases the chances of participating in the out-grower scheme
11	Group Membership	Dummy	+	1=if the household has membership in group 0=if non membership	Group membership increases the chances of being in the out-grower
12	Asset Monetary value	Continuous	+	Total household asset monetary value measured in TZS	More assets ownership increases the chances of participating in the out-grower scheme
13.	Dependency Ratio	Dummy	-	measured by number of people below 15 and above 64	More dependant fewer chances of participating in the out-grower scheme

### 3.0 Results and Discussion

#### 3.1 Household's Characteristics

the findings on household characteristics as presented in Table 3, reveal that MHHs and FHHs had the mean age of 41.4 and 46.8 years respectively. This suggests that Male headed households were younger than the female-headed households were. This may be attributed to the fact that sugarcane farming is labour intensive crop, which requires active age group. As Girei and Giron (2012) observe, the level of involvement in sugarcane out-growing tends to increase with the optimum age group and similarly starts to drop with an increase in age. Moreover, MHHs and FHHs had the mean year of schooling of 7.0 and 5.3 respectively. These findings suggest that both MHHs and FHHs were likely to participate in out-grower scheme, as they were literate enough to use the services from out-grower associations as well as signing contract with the company. Few household heads had education above primary level. The possible explanation is that educated people tend to shun away from agriculture for the white colour jobs and they are more concerned with the time value of money and will prefer to invest in the projects with quick returns, and which are more profitable. Studies by Bahaman *et al.*, (2009) proved that out-grower schemes are among the main option for those with lower education.

**Table 3: Household's Socio-economic Characteristics (n=376)**

Variable	MHHs	FHHs
Age	41.4(14.2)	46.8(16.7)
Years of schooling	7.0(2.7)	5.3(3.2)
Household size	4.2(2.0)	3.6(1.8)
Land size	2.8(3.4)	2.0(2.1)
Frequency of extension visit	0.6(1.5)	0.38(1.0)
Distance to investor	11.6(6.9)	11.8(5.9)
Asset ownership	4565137(8580484)	3884693(6300511)
Total income	2527382(3190548)	1747095 (2768879)

Numbers in brackets are standard deviations of the means and numbers out of brackets are means

The MHHs with the mean land size of 4.2 were more land secured as opposed to FHHs who had the mean land size of 3.6. This suggests that male-headed households had more land, which is required to join the out-grower schemes. Kiwanuka and Machethe (2016) indicate that access to land has a positive implication in participating in the contract farming. MHHs had higher frequency of visits by extension agents than FHHs with the mean visit of 0.6 and 0.3 respectively. These findings suggest that male-headed households had more chances of participating in the out-growers and hence more contact with the company extension officers. Again, MHHs had assets with more value (4565137 mean assets) than FHHs (mean assets 3884693). This suggests that male-headed households had more chances of participating in the out-grower scheme than female-headed households. Studies by Escobal and Cavero (2012 and Kiwanuka and Machethe (2016) reported that households with more assets have more chances of participating in contract farming. MHHs and FHHs had the mean income of 2527382 and 1747095 respectively. This implies that MHHs had more income than FHHs had and since sugarcane is capital-intensive crop, MHHs had more chances of participating in the out-grower scheme. This findings is in contrast with the findings from previous studies, which indicated that

households with lower income are more attracted to be part of agricultural community and out-grower scheme is one of the alternatives that they could choose from (Bahaman *et al.*, 2009)

The findings in Table 4 show that few MHHs and FHHs had access to credit by 24.3 and 27.5 percent respectively. This implies that both MHHs and FHHs had little access to credit, which is still a challenge to poor households. Access to credit helps the household to access agricultural inputs.

**Table 4: Household's Socio-economic Characteristics (n=376)**

Variable	MHHs	FHHs
Access to credit	72 (24.3)	22 (27.5)
Group membership	133 (44.9)	32 (40.0)
<b>Marital status</b>		
Single	41(13.9)	23 (29)
Married	246 (83.1)	0
Separated	7 (2.4)	21 (26.3)
Divorced	0	3(3.8)
Widow/widower	2 (0.7)	33 (41.3)
Total	296	80

Numbers in brackets are percentages while those out of the brackets are frequencies

About group membership, 45 and 40, percent of MHHs and FHHs respectively were in groups. This suggests that MHHs have more chances of joining out-grower association. Studies (e.g. Sharma 2008; Saigenji 2010; Sambuo 2014) established that household membership in any kind of organization affects positively household chances of participating in the out-growers scheme. The findings show further that 83.1 percent of MHHs were married. This might imply that MHHs have additional family labour supply to maintain their out-grower schemes. In another study, Narayan (2010) indicates that married household heads are expected to be more influenced into engaging in the out-grower schemes as opposed to unmarried household heads. This is especially because married household mean more labour force for farming activities.

### 3.2 Socio-Economic Factors for Household Engagement in Out-growers Scheme

The Binary Logistic Regression was used to model the selected variables and household participation in the out-grower scheme as presented in Table 5. The results show that among the thirteen (13) variables, seven variables: demographic variables (age and type of the household head), household group membership, household access to credit, asset ownership, distance to investor, and land size were found to be important predictors for household participation in the out-grower scheme ( $P < 0.05$ ). The strongest predictor was household group membership ( $P = 0.00$ ). The findings in Table 5 indicate that the Hosmer and Lemeshow test showed a Chi-square statistics of 6.523 ( $P = 0.589$ ). The findings show further that Nagelkerke pseudo  $R^2$  statistics that represents the adjusted Cox and Snell Pseudo  $R^2$  statistics was 0.569, which implies that 56.9 percent of the variance in the determinants of household participation in the out-grower scheme was explained by the independent variables that were entered in the model.



**Table 5: Socio-Economic factors influencing household participation in out-growers scheme (n=376)**

Variables	Coefficient (B)	S.E.	Wald	Sig.	Exp(B)
Age of the household head	-0.062*	0.015	18.425	0.000	0.940
Household head marital status	-0.880	0.525	2.810	0.094	0.415
Household head years of schooling	0.039	0.070	0.316	0.574	1.040
Household membership in group/organization	1.979*	0.421	22.071	0.000	7.2346
Household head type	1.370**	0.429	10.214	0.001	3.934
Household access to credit	-1.744*	0.492	12.534	0.000	0.175
Household access to extension services	0.034	0.127	0.071	0.790	1.034
Distance to investor	-0.145*	0.027	29.167	0.000	0.865
Household asset ownership	0.000**	0.000	5.797	0.016	1.000
Household income	0.000	0.000	2.763	0.096	1.000
Household land size	0.232	0.067	11.823	0.001	0.793
Household size	0.113	0.130	0.752	0.386	1.119
Dependency ratio	0.015	0.193	0.060	0.939	1.015

Omnibus Tests of Model Coefficients (Chi-square = 171.128; sig. = 0.000); Cox & Snell R Square = 0.366

Hosmer & Lemeshow Test (Chi-square= 3.614) sig. = 0.890); Nagelkerke R Square = 0.557; \*and \*\* indicate levels of significance at 1 and 5 percent respectively.

The relationship of age of the household head in Table 5 was found to be statistically significant ( $P = 0.000$ ), which implies that the age of the household head was a significant predictor for household to participate in the out-grower scheme. The results also indicated that if the age of the household head increased by one unit, participation in the out-grower scheme would decrease by 0.940 units as indicated by the odds ratio that was 0.940. This implies that household heads with older age (one unit higher) were 0.940 less likely to participate in the out-grower scheme. This can be attributed to the reason that sugar cane production is labour intensive crop that requires energetic farmers. Similar results were reported by other studies including Girei and Giron, (2008) and Minot *et al.* (2009).

Household head type significantly influenced household chances of participating in the out-grower scheme. The findings indicate further that when MHHs increase by one unit, the odds ratio is 3.934, implying that household headed by men increases the chances of participating in the out-grower scheme by 3.934. This finding implies that MHHs are more likely to participate in the out-grower scheme than FHHs. The findings correspond with the findings by other studies (see for example, Tsikata and Yaro, 2013; Hakizimana *et al.*, 2017; Yaro *et al.*, 2017). Group Membership was found to be positively significant on the likelihood of the household to be in the out-grower. The findings indicate that if the number of households in groups increases by one

unit, the odds ratio is 7.236, implying that households with group membership are 7.236 more likely to participate in the out-grower scheme. These are not surprising results as membership in social organizations mean those households are more exposed to training, information, and access to credit, access to extension services, and access to agricultural inputs, which might enhance their participation in the out-grower scheme. Since more households headed by men are in groups it is evident that MHHs are more engaging in the out-grower scheme than are FHHs. Similar findings are reported in other studies (see for example, Sharma, 2008; Saigenji, 2010; Sambuo, 2014) who established that household membership in organization affects positively contract participation.

The results revealed further that access to credit exert a negative but statistically significant effect on the chances of a household to participate in the out-grower scheme. The findings indicate further that when access to credit increase by one unit, the odds ratio is 0.175, implying that household with access to credit have their chances of being in the out-grower decreased by 0.175. This might suggest that households with more credit tend to diversify their livelihood strategies and out-grower scheme might not be their choice of a strategy. MHHs have more credit than FHHs as they have more resources, which can be used as collateral and thus increasing their chances of participating in the out-grower scheme. The findings are similar to those reported by Jabbar *et al.* (2007). Distance of the household homestead to the investor showed negative but statistically significant influence on the household chances of participating in the out-grower scheme. The findings revealed further that when distance increase by one km, the odds ratio is 0.865 implying that households residing far from the investor are 0.865 less likely to participate in the out-grower scheme. an increase in the distance means that the company would incur more costs of transporting cane to the factory for crushing. This is further supported by the discussion with Kilombero Sugar Company (KSCL) official during key informant's interview who reported that one of the criteria for selecting out-growers participants was residing in a distance of not more than 5km from KSCL. Similar results are reported by other studies (e.g. Narayan, 2010; Wainaina *et al.*, 2012; Kiwanuka and Machethe, 2016).

Land size influenced significantly household participation in the out-grower scheme. The findings revealed that when land size increase by one hectare, the odds ratio is 0.793 implying that household with large land sizes are 0.793 more likely to participate in the out-grower scheme. A possible explanation to this could be that household with large arable land size have the opportunity of growing large tracks of sugarcane. Large land size also implies that household can diversify into other crops and reduce the risk inherent in agricultural production. As reported by Wainaina *et al.* (2012), one of the conditions of joining out-grower scheme is access to land and household with large land size have more chances of being in the out-grower.

Likewise, asset ownership had significant positive effects on the households' chances of participating in the out-grower scheme. The odds ratio for asset ownership was 1.000 suggesting that for every unit increase in the asset value, there would be no change on the household's likelihood of participating in the out-grower scheme. It was anticipated that, since sugarcane farming is capital-intensive crop, households with more assets could have more chances of participating in the out-growers scheme in the study area. The results also suggest that MHHs have more assets value than FHHs have, which increases their chances of joining the out-grower scheme. The findings are similar with those reported by other scholars (e.g., Jabbar *et al.*, 2007;

Escobal and Cavero, 2012; Kiwanuka and Machethe, 2016) who reported that an increase in the asset value had a positive significant effect on the chances of a household to participate in contract farming. In addition, elsewhere studies by Daley and Pallas (2014), Doss *et al.*, (2014), Ossome (2014), and Dancer and Tsikata (2015) reported that status in the community and wealth may determine who benefits and who loses out from the out-growers scheme. Therefore, it can be suggested that MHHs are more likely to participate in the out-grower scheme, as they are more asset secured as opposed to FHHs.

### 3.3 Socio-Economic Factors for Household Engagement in Investor Farm Employment

Binary Logistic Regression was used to model the selected variables and household participation in investor farm employment as presented in Table 6. The results of the Binary Logistic Regression revealed that, among the thirteen (13) variables, six variables: Gender variables (age of the household head, household head type, and household marital status), household land size, household asset ownership and household income were found to be important predictors for household participation in the investor farm employment ( $P < 0.05$ ). The strongest predictor was the age of the household head ( $P = 0.00$ ). The findings in Table 5 indicate that the Hosmer and Lemeshow Test showed a Chi-square statistics of 9.019 ( $P = 0.341$ ). The findings show further that Nagelkerke pseudo  $R^2$  statistics which represents the adjusted Cox and Snell Pseudo  $R^2$  statistics was 0.339, which implies that 33.9 percent of the variance in the determinants of household participation in the investor farm employment was explained by the independent variables which were entered in the model.

**Table 6: Socio-Economic Factors Influencing Household Participation in Investor Farm Employment (n=376)**

Variables	Coefficient (B)	S.E.	Wald	Sig.	Exp(B)
Age of the household head	0.059*	0.014	17.386	0.000	1.061
Household head marital status	0.838*	0.330	6.446	0.011	2.311
Household head years of schooling	-0.004	0.060	0.005	0.941	0.996
Household membership in group/organization	-0.259	0.342	0.568	0.451	0.773
Household Type	-1.226**	0.390	9.872	0.002	0.293
Household access to credit	-0.226	0.412	0.301	0.583	0.798
Household access to extension services	0.281	0.172	2.674	0.102	1.325
Distance to investor	0.024	0.021	1.386	0.239	1.025
Household asset ownership	-0.021	0.018	4.833	0.028	0.781
Household income	-0.003	0.002	5.995	0.014	0.999
Household land size	0.301**	0.102	8.674	0.003	1.351
Household size	-0.141	0.118	1.437	0.231	0.868
Dependency ratio	0.273	0.175	2.415	0.120	1.313

Omnibus Tests of Model Coefficients (Chi-square = 155.512; sig. = 0.000); Cox & Snell R Square = 0.339

Hosmer & Lemeshow Test (Chi-square= 9.019) sig. = 0.341); Nagelkerke R Square = 0.465; \* and \*\* indicate levels of significance at 1%, and 5% respectively.

The findings showed that age of the household head was the strongest predictor of the chances of the households to participate in the investor farm employment. The findings were statistically significant at  $P = 0.000$  and  $\text{Exp}(B) = 1.061$ . A Wald of 17.386 demonstrates that the age of the household head contributes significantly to predicting the chances of households to participate in the investor farm employment. The results indicate further that when the age of the household head increases by one year, the odds ratio is 1.061, implying that older household heads are 1.061 more likely to participate in the investor farm employment. This suggests further that young household members are more likely to participate in other off-farm activities such as “Boda boda” business that attract more income as opposed to working in the investor –farm wage work. During FGDs, it was reported that investor farm employment is seen by youth as inferior, strenuous, and difficult with low wages especially in cane cutting task.

*“..... Many youth in this area see cane cutting as inferior task. You cannot find any cane cutter who was born in this village or neighbouring villages; in most cases can-cutters are coming from Iringa and Mbeya region.....”* (Male youth FGDs participant, Sanje, 30<sup>th</sup> November 2016).

The study by Dancer and Sulle (2015) indicate that in sugarcane sector, there is a strong gender differentiation between young male can cutters and weeders majority of whom are women and older men. Also Knapman *et al.* (2017) reported that as a result of large-scale agricultural investment in Uganda and Ghana, youth were mostly affected by lack of land access and shifted to off-farm occupations. Other youth migrated in the urban areas and other rural areas.

Regarding household head type and participation in the investor farm employment presented in Table 6, the results were found to be statistically significant ( $P = 0.002$ ), which implies that the household head type was a significant predictor of household participation in the investor farm employment. It was also indicated that if the household was headed by men, participation in the investor farm employment decreases by 0.293 units as indicated by the odds ratio that was 0.293. This implies that those households headed by men were 0.293 times less likely to participate in the investor farm employment. These findings imply that investor farm employment is not that lucrative employment to attract men’s participation. This is because of low wages associated with large-scale agricultural investment employment. Similar findings are reported in the literature (see for example, Dolan and Sorby, 2003; Singh 2003; Maertens and Swinnen, 2009), which that in flowers, canola, poultry and Vanilla in Kenya, Uganda, Zimbabwe, Colombia and Ecuador respectively, women occupied at least 50 percent of all employment generated. Likewise, the findings are support the previous findings by Smalley (2013) who also revealed that poor women with limited livelihood options are likely to participate in employment opportunities created by large-scale agricultural investments. The findings are in contrast with the findings reported by other scholars (e.g., FAO 2011; Tsikata and Yaro 2013; UNCTAD 2015; Dancer and Tsikata 2015; Lanz and Daley 2016) who revealed that employment created by large-scale agricultural investment benefit more men than women. The above contradictions may suggest that MHHs in Kilombero Valley have more income, which can be invested in other income generating activities that attract more income than does working as casual workers in large-scale agricultural investments.

The results show further that land size had positive significance with the likelihood of household to participate in investor farm employment. The results indicated further that, when land size increases by one hectare, the odds ratio is 1.351, implying that household with larger land size are 1.351 more likely to participate in the investor farm employment. This result implies that, household engaging in investor farm employment is also likely to combine wage employment and farming activities. This claim is further supported by FGD's results, which show that most household participate in the investor farm employment at KPL during maize harvesting season when these households have already harvested their paddy and are waiting for next farming season.

*“.....We normally combines farming in our own field with casual labour at KPL. During farming season some of us do not work for KPL rather we work on our paddy field and after harvest we seek casual labour like weeding and harvesting of maize which are grown by KPL after they have harvested Paddy.....” (FGDs Female participant at Mchombe Village, 7<sup>th</sup> December 2016).*

During discussion with KIIs in Mngeta and Mchombe villages, it was also reported that, during farming season most households concentrate in their paddy fields and after farming season especially when KPL is growing irrigated maize, some households find work in weeding and harvesting maize. Positive and significant influence of land size can also be explained by the fact that household with better land holding opted for additional income in casual labourer works to finance their farming expenses in the next season. This result is congruent with the results in other studies including Hakizimana *et al.*(2017); Yaro *et al.*(2017) who also reported that a combination of wage employment and own farming is an important basis for livelihood for household living in the communities with large-scale agriculture investments. Marital status significantly influenced household participation in the investor farm employment. It was found that when married household head increase by one unit, the odds ratio is 2.311, implying that households with married household head are 2.31 more likely to participate in the investor farm employment. The possible explanation is that married household heads have large family sizes and are likely to have extra and unemployed labour, which helps them to allocate this workforce outside the agricultural sector. Similar findings were reported by Hakizimana *et al.*, (2017) who found that married household living adjacent to large-scale agricultural investments were diversifying their income sources between on-farm in the out-grower scheme and off-farm sources especially wage employment in these investments.

Household income had significant negative influence on the households' participation in the investor farm employment. It was indicated further that when household income increased by one unit, the odds ratio was 0.999, implying that households with more income are 0.999 less likely to participate in the investor farm employment. This implies that at higher levels of household income, the household are less likely to participate in the investor farm employment because they have enough resources to finance their farming activities and remain with enough for financing other non-farm income generating activities. Smalley (2013) reported that investor farm employment is occupied by poor households with limited livelihood options. Household asset ownership negatively influenced household participation in the investor farm employment. It was found that when household assets increase by one unit, the odds ratio is 0.781, which implies that households with more assets are less likely to participate in the investor farm

employment. The reasons for this might be that, the household assets can act as collateral for credit demand, which can be used to finance farm and other non-farming income generating activities. Similar findings are reported by Davis et al., (2010) who found that agricultural wage employment is performed by households with few assets and who lack the ability of engaging in high rewarding income generating activities.

#### 4.0 Conclusions and Recommendations

It is concluded that household participation in the out-growers scheme is influenced by socio-economic characteristics. Gender variables such as the age and household head type influence significantly household participation in the out-grower scheme. Participation in the out-grower scheme tends to increase with an increase in land size and household group membership. On the other hand, participation decreases with an increase in access to credit, distance to the investor and asset ownership. The likelihood of a household to participate in the investor farm employment is also influenced by socio-economic characteristics with gender variables: age, household head type, and household marital status exerting positive significance influence. Household asset ownership, household income, and land size increase the chances of household's participation in the investor farm employment. Therefore, household participation in the out-grower scheme favour youth household head, MHHs, household in groups, household with higher land size, HHs with less access to credit and household with few assets. On the other hand, participation in the investor farm employment favour those households with older FHHs, low income, few assets, married and households with large land size.

Therefore, there is a need of providing sugarcane technical training to out-growers. Understanding of the factors that affect households' participation in the out-grower scheme and investor farm employment and how they relate to participation decision should be an important part in designing of interventions aimed at improving production uptake. This study was based on sugarcane out-grower scheme. There is a need for further research on the determinants of household participation in contract farming in other crops such as cotton, sisal, coffee and other crops.

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